

Amendments to the Claims:

Listing of Claims:

Claim 1 (currently amended): A method of defect root cause analysis comprising following steps:

- 5 providing a sample being processed through a plurality of semiconductor processes,
wherein the sample ~~which~~ comprises a plurality of defects;
 performing a defect inspection to detect sizes and locations of the plurality of
defects;
 performing a chemical state analysis of the sample;
10 performing a mapping analysis according to a result of the chemical state analysis,
wherein the mapping analysis comprises:
 forming the defects into a defect pattern; and
 ~~combining~~ comparing the defect pattern with a predetermined pattern on the
sample; and
15 analyzing the root cause of the defects according to the comparison between
~~combination of~~ the defect pattern and the predetermined pattern on the sample for
determining the semiconductor process causing the defect.

- Claim 2 (original): The method of claim 1 further comprising performing a defect
20 classification after finishing the defect inspection for judging a defect type of the defects
and performing a corresponding chemical state analysis according to the defect type of
the defects.

- Claim 3 (original): The method of claim 1 wherein an auger analysis is performed in the
25 chemical state analysis when the defects are smaller than 0.2 μ m or are not single phase
particles.

Claim 4 (original): The method of claim 3 wherein the auger analysis utilizes a scanning

auger microscopy (SAM) or an auger electron spectroscopy (AES) to perform the chemical state analysis of the sample.

5 Claim 5 (original): The method of claim 1 wherein an energy dispersive spectrometer (EDS) is utilized to detect in the chemical state analysis when the defects are equal to or larger than $0.2 \mu\text{m}$, single phase, or thick particles.

Claim 6 (original): The method of claim 1 wherein the chemical state analysis comprises a point scan analysis, delayer analysis, and depth profile analysis.

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Claim 7 (currently amended): A method of defect root cause analysis comprising following steps:

providing a sample being processed through a plurality of semiconductor processes, wherein the sample comprises with a plurality of defects;

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performing a voltage contrast to identify locations of the defects;

cutting the sample with a focus ion beam (FIB) to expose a cross-section of the sample;

utilizing auger electrons to perform a chemical state analysis of the cross-section of the sample;

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performing a mapping analysis according to a result of the chemical state analysis, wherein the mapping analysis comprises:

forming the defects into a defect pattern; and

~~combining~~ comparing the defect pattern with a predetermined pattern on the sample;

and

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judging a root cause of the defect generation according to the comparison between ~~combination~~ of the defect pattern and the predetermined pattern on the sample for determining the semiconductor process causing the defect.

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Claim 8 (original): The method of the claim 7 wherein the method utilizes a scanning auger microscopy (SAM) or an auger electron spectroscopy (AES) to perform a chemical state analysis of the cross-section of the sample.

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Claim 9 (original): The method of claim 7 wherein the chemical state analysis comprises a point scan analysis.